



## Bacteria TMDLs in the Cedar and Licking Run Watersheds

Final Public Meeting  
March 23, 2004



## Presentation Overview

1. Overview of Virginia's TMDL Program
2. Applicable Water Quality Standard
3. Cedar and Licking Run Impairments

## What is a TMDL ?

- TMDL stands for **Total Maximum Daily Load**
- A TMDL is a **pollution budget**
- A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet **water quality standards**
- A TMDL includes an **allocation** of that maximum amount to the pollutant's sources

## TMDL Equation

A TMDL is summarized as:

$$\text{TMDL} = \text{Sum of WLA} + \text{Sum of LA} + \text{MOS}$$

Where:

- TMDL = Total Maximum Daily Load
- WLA = Waste Load Allocation (point sources)
- LA = Load Allocation (nonpoint sources)
- MOS = Margin of Safety

## How is a TMDL developed?

- Identify all sources of a given pollutant within the watershed
- Calculate the amount of pollutant entering the stream from each source
- Calculate the pollutant reductions needed, by source, to attain water quality standards
- Allocate the allowable loading to each source and include a margin of safety

## When are TMDLs needed?

- State and federal law require TMDLs to be developed for **impaired** waters
- Impaired waters do not meet applicable **water quality standards** (WQS)
- Waters that do not meet WQS do not support their **designated use(s)**
- For bacteria impairments, the designated use that is affected is the **recreational use**

## Regulatory Basis of TMDLs

- TMDLs required by Federal and State law
  - 1972 Clean Water Act (CWA), Section 303(d)
  - 1997 Water Quality Monitoring, Information and Restoration Act (WQMIRA)
- 1998 lawsuit filed by the American Canoe Association and the American Littoral Society against EPA for failure to comply with CWA §303(d) in Virginia
- 1999 Consent Decree requiring EPA and Virginia to complete 636 TMDLs by 2010

## Regulatory Requirements

- Both state and federal law require:
  - Establishment of water quality standards
  - Monitoring of water quality in surface waters
  - Assessment of water quality in surface waters
  - Listing of waters that do not meet water quality standards (impaired waters)
  - Development of TMDLs for impaired waters
- State law requires, and federal law recommends:
  - Development of a TMDL Implementation Plan

## Roles of DEQ and DCR in TMDL and IP Development

- DEQ is the lead for TMDL development, including submittal to EPA
- DCR is the lead for TMDL Implementation Plan (IP) development
- DEQ is responsible for ensuring public participation in the TMDL program

## Presentation Overview

1. Overview of Virginia's TMDL Program
2. Applicable Water Quality Standard
3. Cedar and Licking Run Impairments

## Water Quality Standards

- Water Quality Standards (WQS):
  - set by states and approved by EPA
  - set **numeric** and **narrative** limits on pollutants
  - consist of **designated use(s)** and water quality **criteria**
- Purpose of WQS:
  - **protection** of 5 designated uses (aquatic life, fish consumption, shellfish, recreation, drinking water)
  - **restoration** of state waters to meet criteria

## Applicable Designated Use

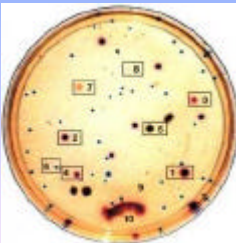
- All surface waters in Virginia are currently designated for **primary contact recreation** (e.g. swimming)
- In March 2003, a **secondary contact recreation** use designation (e.g. wading, fishing) was added to the WQS
  - Five times the primary contact criteria
  - Individual waters will only be considered for reclassification after TMDL implementation has been tried using reasonable BMPs
  - Approved by EPA and effective Feb. 12, 2004

Pollutant of Concern

- *Fecal bacteria* are found in the digestive tract of humans and warm blooded animals
- Fecal bacteria are an indicator of the potential **presence of pathogens** in waterbodies
- The presence of fecal bacteria in water samples is a strong indicator of recent **sewage or animal waste contamination**

Sampling for Bacteria

- Stream samples are collected in sterile 125 mL sample bottles
- Samples are filtered to deposit bacteria on filters
- Filters are incubated, allowing individual bacteria to grow into visible colonies
- Colonies are counted to give a concentration of colony forming units (cfu) per 100 mL



Old Criteria

- Indicator species: **fecal coliform**
  - used in listing Cedar and Licking Runs
- **Instantaneous max:** **1,000 cfu/100 mL**
- **Geometric mean:** **200 cfu/100 mL**
- Applicable for data sets with 1 or fewer samples in 30 days
- Applicable for data sets with 2 or more samples in 30 days
- Used in **water quality assessment** because monitoring is usually conducted bimonthly
- Used in **TMDL development** because model output is usually daily

New Criteria

- Indicator species for freshwater: *E. coli*
  - change in indicator species from fecal coliform to *E. coli* (fresh water)
  - *E. coli* bacteria are a **subset of fecal coliform** bacteria and correlate better with swimming-associated illness
- **Instantaneous max:** **235 cfu/100 mL**
- **Geometric mean:** **126 cfu/100 mL**
- Applicable for all data sets; no samples may exceed the maximum
- Applicable for data sets with 2 or more samples in a calendar month

Interim Criteria

- Indicator species: **fecal coliform**
  - will be phased out when 12 *E. coli* observations available or after June 30, 2008, whichever comes first
  - will not be used to assess compliance
- **Instantaneous max:** **400 cfu/100 mL**
- **Geometric mean:** **200 cfu/100 mL**
- Applicable for all data sets; no more than 10% of samples in a calendar month may exceed the maximum
- Applicable for data sets with 2 or more samples in a calendar month

Comparison of the Old Fecal Coliform and New *E. coli* Criteria

Old FC (cfu/100mL)	Interim FC (cfu/100mL)	FC translated to EC* (cfu/100mL)	New EC (cfu/100mL)
200	200	129	126
	400	243	235
1,000		565	

\* Based on regression model between 493 dual data points  
Note: FC = Fecal Coliform, EC = *Escherichia Coli*

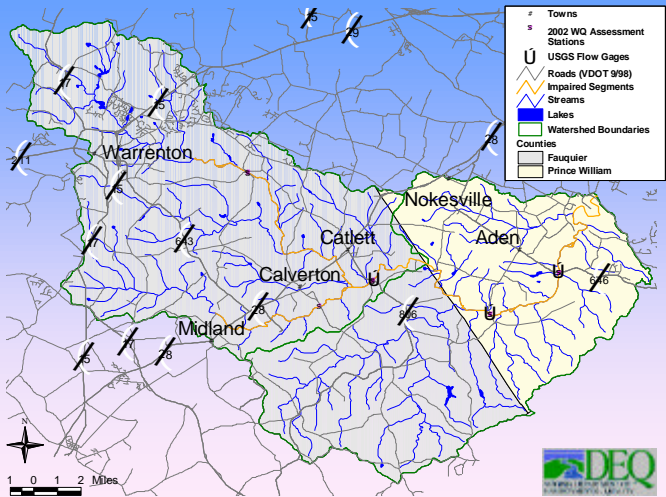
# Presentation Overview

- 1. Overview of Virginia’s TMDL Program
- 2. Applicable Water Quality Standard
- 3. Cedar and Licking Run Impairments

# Impairments in the Cedar and Licking Run Watersheds

WATER BODY	CAUSE	STREAM NAME	LENGTH (Miles)	YEARS LISTED
VAN-A17R, VAN-A18R	Bacteria	Cedar Run (from Mill Run to Occoquan River)	28.32	1996, 1998, 2002
VAN-A17R	Bacteria	Licking Run (from mouth of Germantown Lake to Cedar Run)	6.58	1998, 2002

# Map of the Cedar Run Watershed



# 2002 Water Quality Assessment Results for Bacteria

WBID	Monitoring Station	Type*	Fecal Coliform**
N-A17R	1aCER016.46	A,B	4 / 24 P
N-A17R	1aCER025.25	A	5 / 23 P
N-A17R	1aLIL001.43	A	5 / 24 P
N-A18R	1aCER006.00	A	10 / 49 P
N-A18R	1aCER009.52	SS	3 / 11 N

\* Station Types: A = ambient, B = biological, SS = special study  
\*\* Impairment Status: P = partially supporting, N = not supporting

# Bacteria TMDLs in the Cedar and Licking Run Watersheds

- First public Meeting
  - July 10, 2003, Catlett, VA
- Second Public Meeting
  - October 23, 2003, Nokesville, VA
- Final public meeting
  - March 23, 2004, Calverton, VA
  - Draft report available for public review at <http://www.deq.state.va.us/tmdl/>
- Public comment period ends **April 21, 2004**

# Bacteria TMDLs in the Cedar and Licking Run Watersheds

Kate Bennett  
Regional TMDL Coordinator  
Northern Virginia Regional Office  
VA Department of Environmental Quality  
13901 Crown Ct.  
Woodbridge, VA 22193  
Phone: (703) 583-3896  
Fax: (703) 583-3841  
E-mail: [kebennett@deq.state.va.us](mailto:kebennett@deq.state.va.us)

